

strains, the 3.7 kb plasmid was similarly restricted producing two restriction fragments (4.5 kb and 5.5 kb) (Figure 3) in each indicating two *EcoRI* sites. This widely present miniplasmid (3.7 kb), if further characterized, might be helpful in developing genetic tools for plasmid-based detection^{10,11} of this pathogen.

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Efficient regeneration of *Taxus baccata* by a non-hormonal chemical treatment

The Himalayan yew, *Taxus baccata*, is the only source of taxol, the anticancer drug in India. A very small number of this tree are found in the forests in Jageshwar area of Almora district situated at an altitude of about 1800 m. The *Taxus* plants are growing in association with dominant *Cedrus deodara* forest without interfering with each other. Large scale cutting, looping and stamping has brought the *Taxus* at the verge of extinction in this area of Kumaun Himalaya. The growth of the tree is very slow and has a long seed dormancy period. Propagation of the plant occurs through seeds and not through vegetative means in natural conditions. Formation of taxol in cell suspension cultures requires a long incubation period and which, therefore, cannot compete with commercial field propagation of *Taxus* sp.¹. An embryo culture method to develop seedlings has been described with very little success². Several factors have been studied to induce rooting in cuttings of *Taxus* sp. and it was observed that a rooting hormone IBA was usually only effective in increasing the speed of rooting³. Here we describe a non-hormonal chemical treatment to induce rooting in cuttings of the Himalayan yew.

Apical cuttings of 10-15 cm length of *T. baccata* were brought in sterile polythene bags from the Jageshwar forest area in December 1994. The cuttings were dipped in 2% non-hormonal chemical for 24 h and planted in polythene bags containing soil with 50% decomposed oak leaves, 25% cow-dung manure and 25% garden soil. These planted bags were kept in shade for 10 days and then were placed in the open. The atmospheric temperature of the place ranged between -4° and 25°C during the period of experiment. The *Taxus* cuttings experienced a heavy snow-fall in the second week of January 1995 and remained covered completely for 10 days under the snow. For three months till March, the cuttings continued to survive but remained dormant. In April, however, the apical dormant buds started enlarging and gradually grew into a branch of about 10 cm during the subsequent three months. The base of the cuttings under soil exhibited callus formation which increased in size with time. When the size of the callus reached about 9 mm, root (5 cm long) formation was observed. The rate of survival and regeneration of the cuttings was 70%.

These findings emphasize the importance of propagating *Taxus* through cut-

tings by non-hormonal chemical treatment easily. This investigation may help increase *Taxus* population for periodic harvesting of twigs and needles to meet the taxol requirements as well as in saving the Himalayan yew from exploitation and extinction.

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